

CIRCULAR BILBAO-BIZKAIA

Circle City Scan project in Bilbao-Bizkaia

Bilbao, September 19th 2017



Bilbao Ekintza

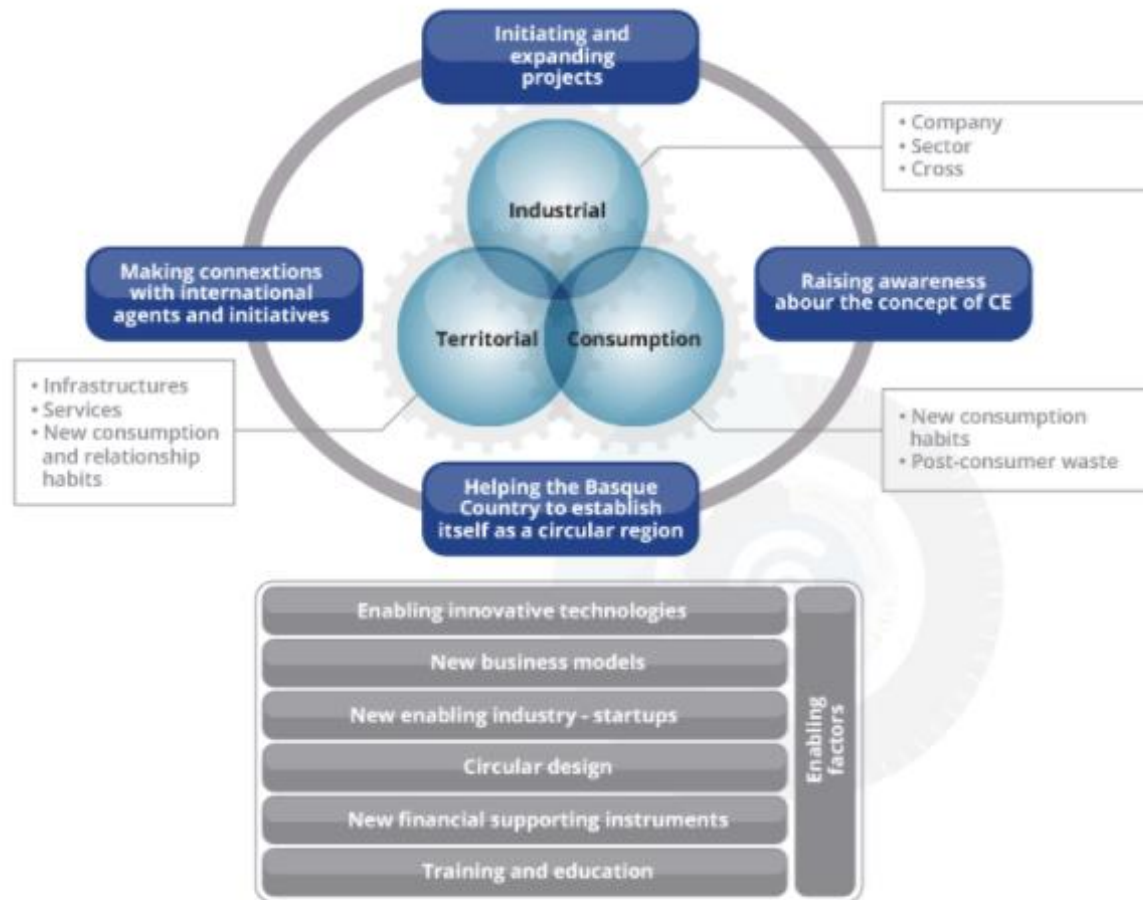


Beaz
Bizkaia



innobasque
berrikuntza
erakundeak
agentea
de la innovación

Innobasque's value proposition

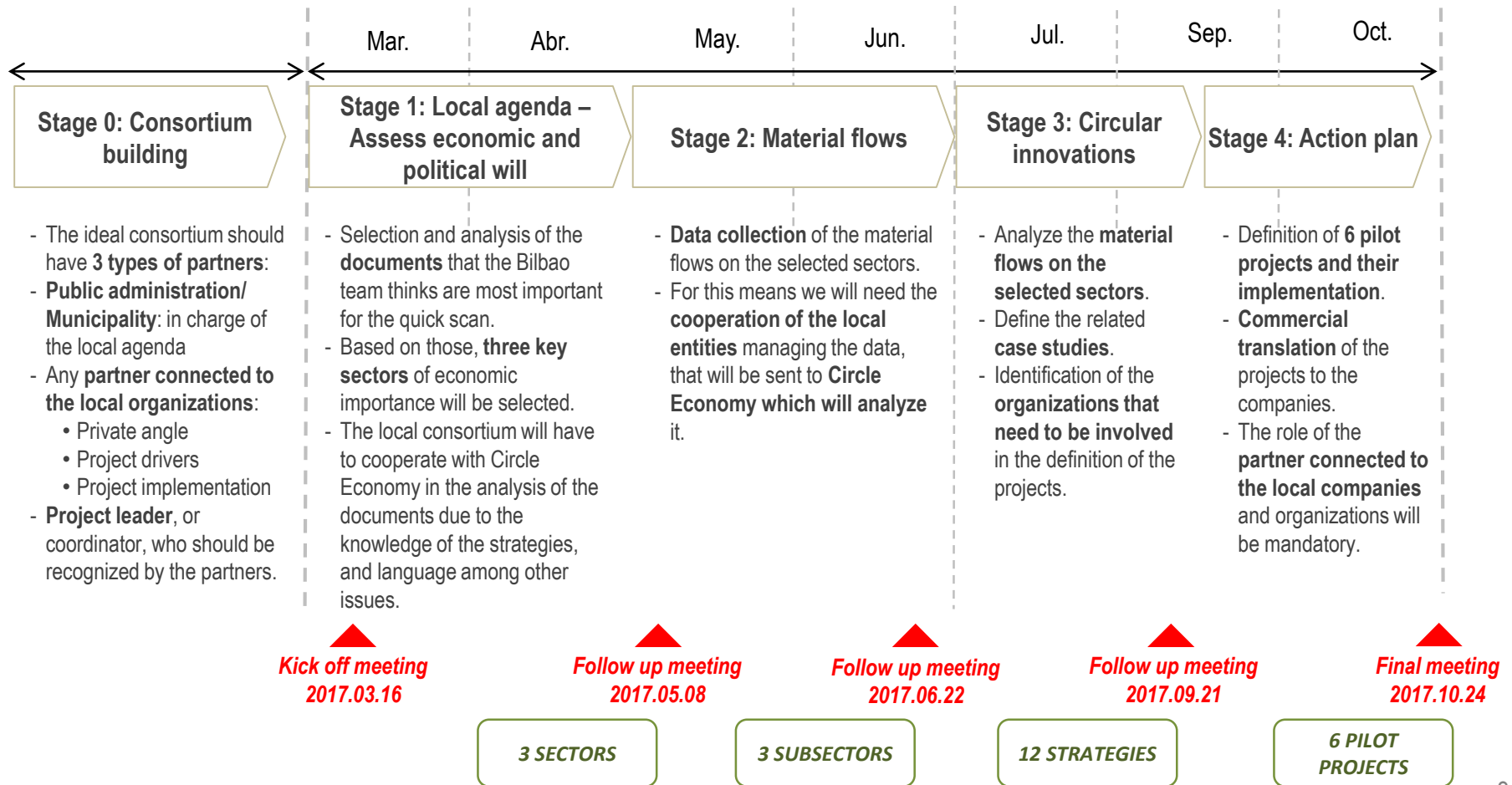


Circle City Scan of Bilbao Scope



The *Circle City Scan* by Circle Economy is a four stages project conducted together with a local consortium

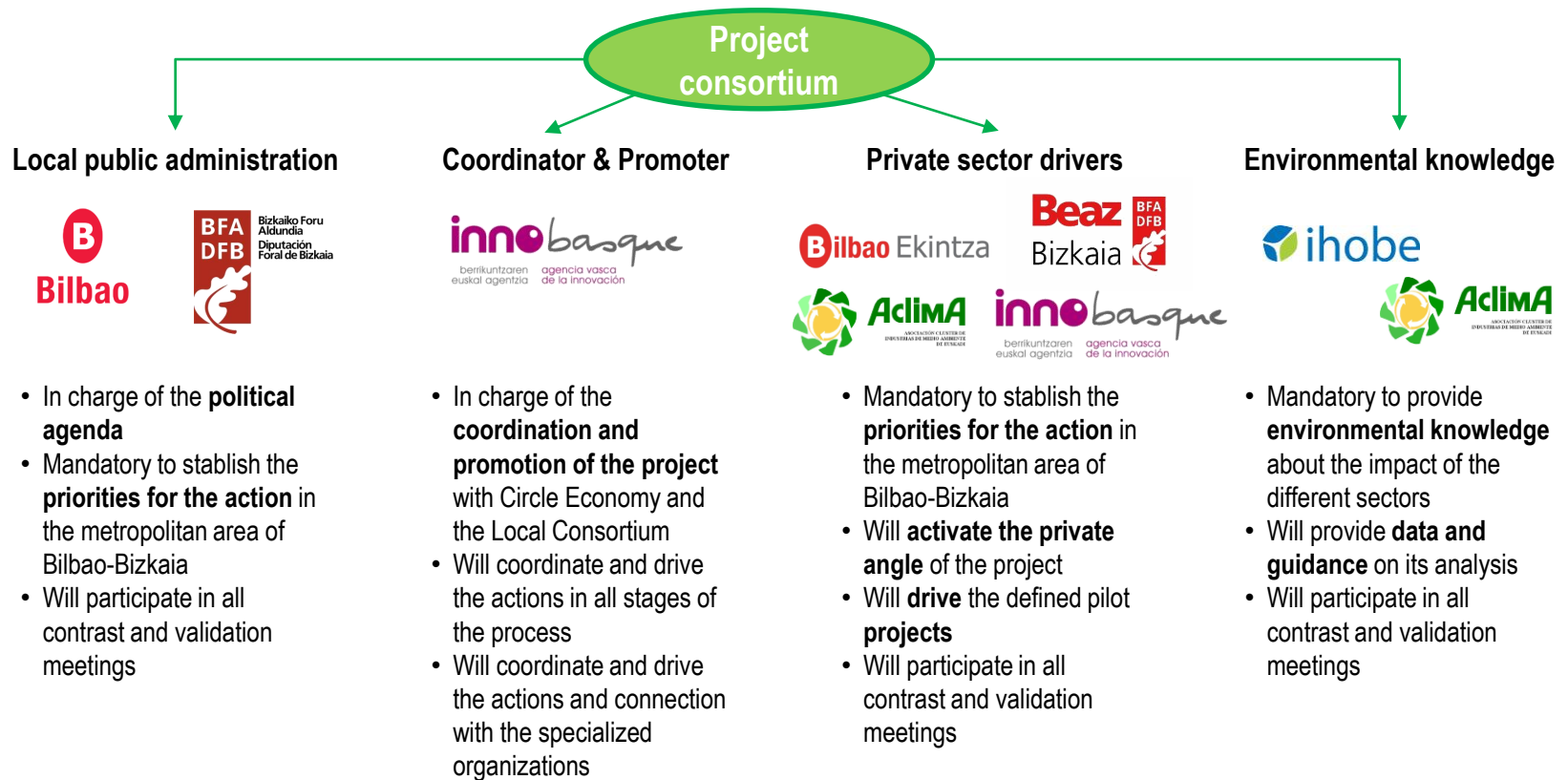
Starting from the consortium building phase, the whole process will last around 8-9 months



Stage 0: Consortium building



The success of the project needs a team with key players, and an articulated structure of relevant organizations with key capacities for the execution of the actions



Stage 0: Consortium building



The mentioned relevant organizations will play a role during the project stages, when they are closely related to the analyzed sectors and material flows, and for the project implementation.

- They could be clusters, sectorial associations, and/or any other public organizations.
- These will be invited to participate according to the specific needs at each time.

Organizations
with key
capacities for the
execution of the
actions

Clusters



EVE



Company
associations



ASOCIACIÓN DE DISEÑADORES DE EUSKADI EUSKADIKO DISEINUGILEEN ELKARTEA

Public agents,
and other



ILLUSTRATIVE

Stage 0: Consortium building



In order to maximize the efforts, the project consortium will be organized in 2 levels, and will have different responsibilities during the project execution

1

DECISION MAKING

- **First level** responsible people.
- Will be available for **intermediate contrast** (follow up meetings), and **guidance** in each stage (internal meetings, interviews, etc.).
- Will **facilitate the implication of the necessary organizations** during the process.
- Will **validate the outputs** of each stage, by participating in the follow-up meetings.

- **XX** (Ayuntamiento de Bilbao)
- **XX** (Diputación Foral de Bizkaia)
- Ainara Basurko (BEAZ)
- Nora Sarasola (Bilbao Ekintza)
- Lola Elejalde (Innobasque-COORD.)
- Kristina Apiñaniz (Aclima)
- **XX** (Ihobe)

2

TECHNICAL (Operative)

- **Second level** responsible people (technical knowledge).
- Will have a **deep implication** in the project, according to the specific technical knowledge.
- Will **contribute to the analysis and output** development, guided by the project coordinator.
- Will **give guidance to Circle Economy** during the process.
- Will **choose the organizations** that will have to take part in each stage of the process, and manage the relationship with them.

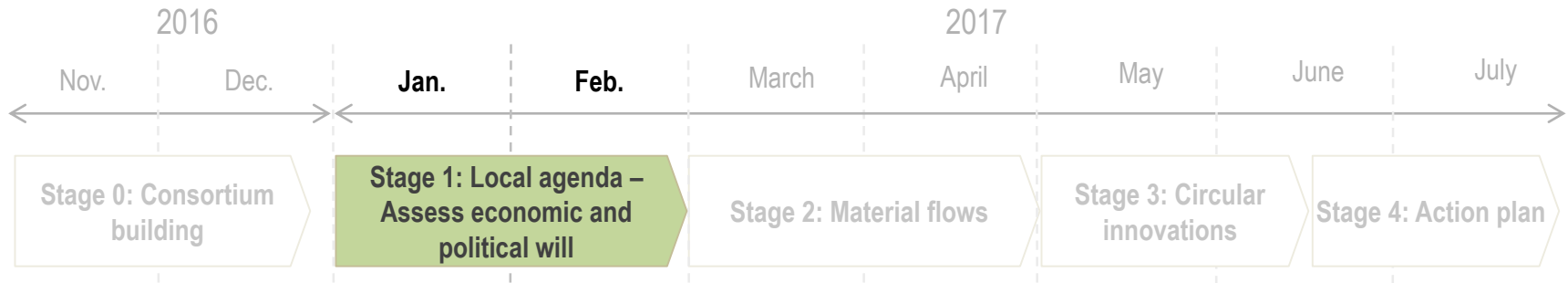
- **XX** (BEAZ)
- **XX** (Bilbao Ekintza)
- Oihana Blanco (Innobasque-COORD.)
- **XX** (Aclima)
- **XX** (Ihobe)

Stage 1: Local agenda

Assess economic and political will



Assessment of the priority sectors within the selected area, which have a strong political will to create rapid change towards a circular economy



➤ We will discover what are the most important sectors for the area, through **policy documents**, **online research**, **economical data gathering** and specially **interviews**.

➤ We will look at **issues** as:

- What are the most important sectors based on policy targets;
- Economical value of the sector to the local economy;
- Amounts of money invested by the municipalities in the sectors;
- Amount of jobs provided by the different sectors;
- What sector are distinguishing the municipality from the rest of the country, etc.;
- Which sectors expel most emissions, waste, etc.

Responsibilities/functions of the technical team

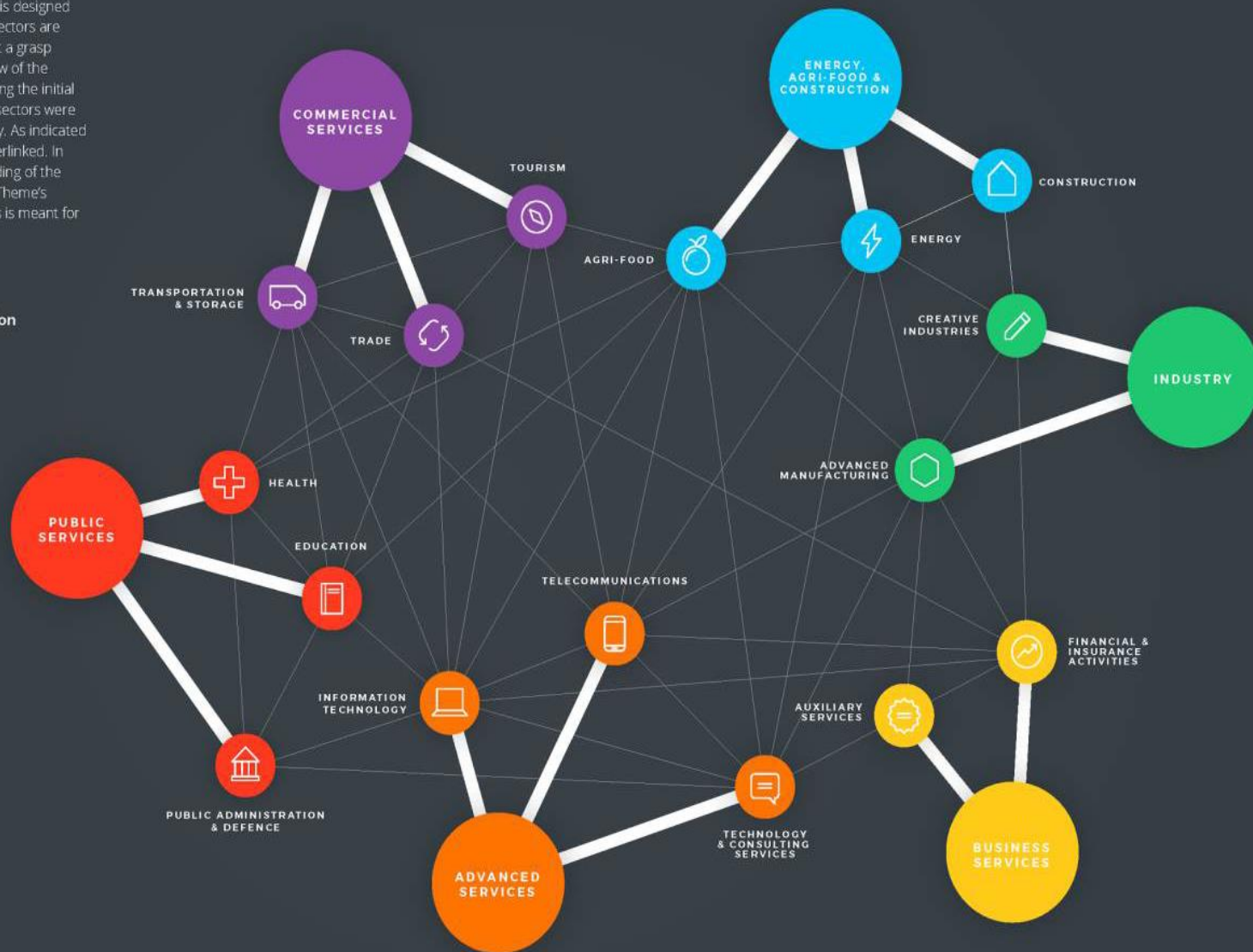
- ✓ **Selection of documents** (Circle Economy will include a Spanish speaker in the team);
- ✓ **Identification of **sectoral data** owners/providers;**
- ✓ **Selection of **technical** and **non technical** criteria;**
- ✓ **Support and guidance on the **data analysis**;**
- ✓ **Identification of experts** for the interviews (the coordinator will participate);
- ✓ **Guidance and validation of the **sectoral prioritization**.**



The first phase of the Circle City Scan is designed to identify what the most important sectors are throughout the city and region. To get a grasp on how a city is structured an overview of the most relevant sectors is created. During the initial exploration of Bilbao and Bizkaia, 16 sectors were identified as the heart of the economy. As indicated in the graph, all of the sectors are interlinked. In order to provide a clearer understanding of the sectors they were categorized into 6 Theme's according to their characteristics. This is meant for illustrative purposes.

Themes

- Commercial services
- Energy, Agri-food & Construction
- Industry
- Business Services
- Advanced Services
- Public Services

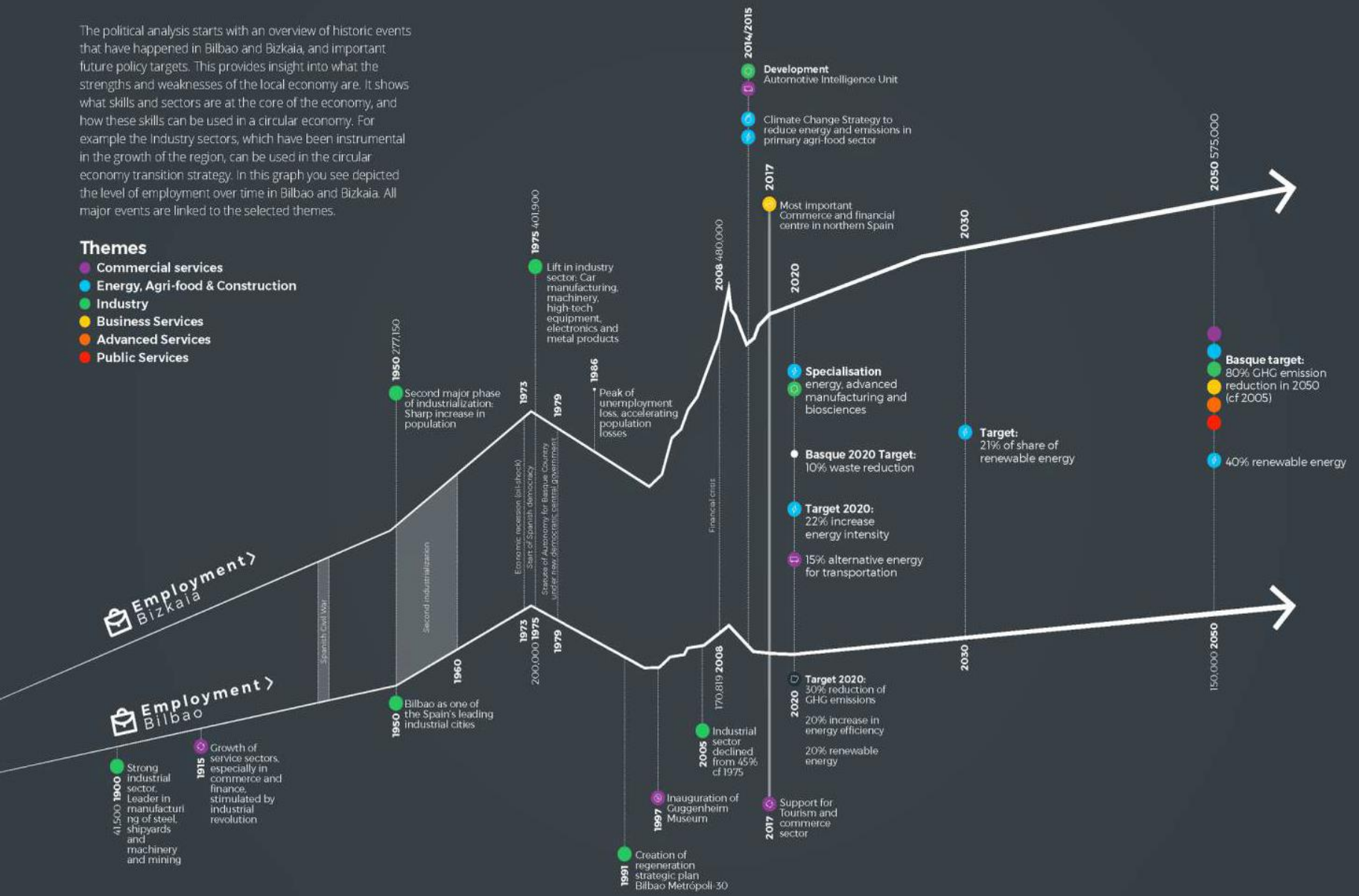




The political analysis starts with an overview of historic events that have happened in Bilbao and Bizkaia, and important future policy targets. This provides insight into what the strengths and weaknesses of the local economy are. It shows what skills and sectors are at the core of the economy, and how these skills can be used in a circular economy. For example the Industry sectors, which have been instrumental in the growth of the region, can be used in the circular economy transition strategy. In this graph you see depicted the level of employment over time in Bilbao and Bizkaia. All major events are linked to the selected themes.

Themes

- Commercial services
- Energy, Agri-food & Construction
- Industry
- Business Services
- Advanced Services
- Public Services





Main conclusions:

1. Industrial revolution leading to strong industry sector
2. Accompanied development of commerce and finance
3. Decline of industry after 1975, leading to restructuring grey economy and development of Commerce and Tourism
4. Specialized of the industry to Advanced Manufacturing, such as car industry
5. More balanced economy, with strong industry, services and commerce sector

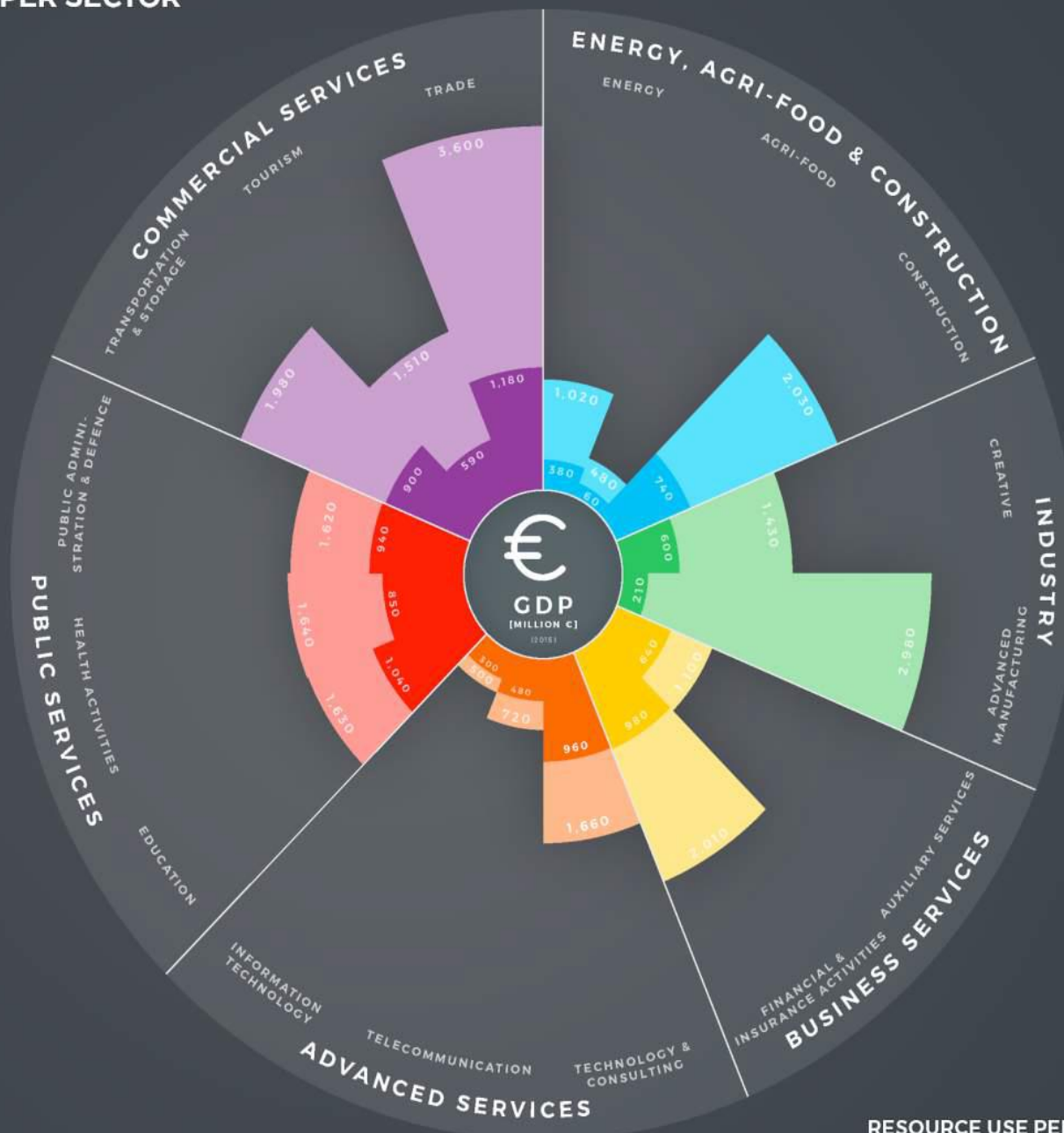


The economic analysis starts with an overview of the employment numbers for Bilbao and Bizkaia. In the graph on the right the employment numbers for each of the 16 sectors are depicted. The dark color represents the number of jobs in the city of Bilbao whereas the light color represents the number of jobs in the province of Bizkaia. The larger the surface, the larger the number of jobs. At first glance it can be observed that most jobs are in commercial services and the least are in production.





The second part of the economic analysis is an exploration of Gross Domestic Product (GDP) per sector. This provides insight into the value that each of the sectors provide to the local economy. In the graph the dark color represents the GDP in the city of Bilbao whereas the light color represents the GDP in the province of Bizkaia. The larger the surface, the larger the GDP.





The accompanying effect of economic activities specified in the last paragraph are the resources needed to fuel the economy. In this overview the resource use per sector is indicated to provide insights in which sectors have the highest resource use, and the largest potential to reduce resource use through circular strategies. In the graph the dark color represents the resource use in the city of Bilbao whereas the light color represents the resource use in the province of Bizkaia. The larger the surface the higher the resource use.



Main conclusions:

Jobs:

- Industry, Commerce

Economic Value

- Industry (Advanced manufacturing mainly) and Services, Energy and Commercial Services (Transportation and storage)

Resource use:

- 'Energy, Agri-food, Construction' and Industry



The top 10 sectors were chosen based their GDP employment level, resource use, and waste production. For each of the sectors, the economic score (left part of the indicator) and circular score (right part of the indicator) are shown. These scores are visually represented for Bizkaia (top part of the indicator) and Bilbao (lower part of the indicator). The economic score is based on GDP and employment level, where the sector with the most jobs or highest GVA receives a score of 10, meaning it has the highest potential to contributing to the circular economy. The circular score is based on resource use and waste production, where the sector with the highest resource use and waste production receives a score of 10, meaning it has the highest potential to contributing to the circular economy. In the graph the dark color represents the score for Bilbao whereas the light color represents the score for Bizkaia. Based on their accumulated scores the sectors are ranked from having the lowest to the highest potential to help in transitioning Bilbao and Bizkaia to a circular economy.



INFORMATION
TECHNOLOGY



TELECOMMUNICATION



AGRI-FOOD



TOURISM



ENERGY



TRANSPORTATION
& STORAGE



CREATIVE
INDUSTRY



TRADE



CONSTRUCTION



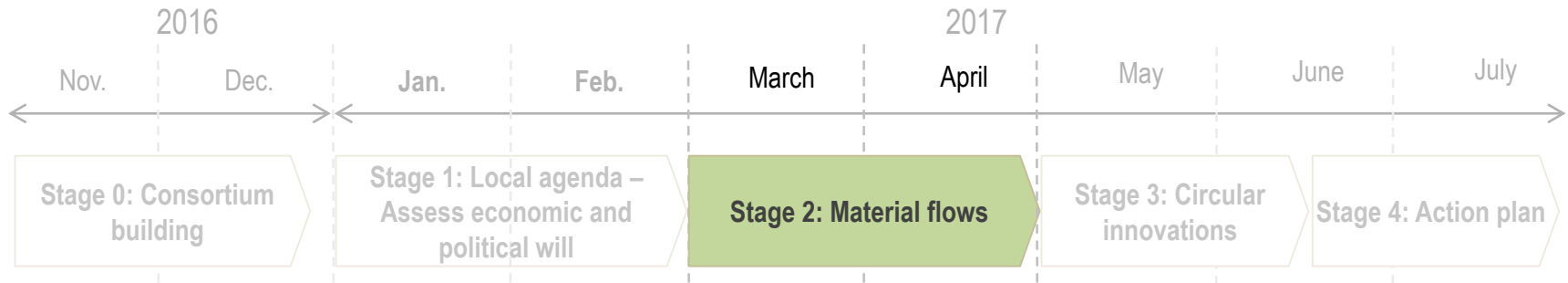
ADVANCED
MANUFACTURING



Stage 2: Material flows



Mapping out the economic, environmental and social impacts



- Once the sectors are selected, we will **collect data of the material flows** of each one.
- We will **analyze the environmental impact** of the sectors, to **identify the most pressing issues***:

- Energy; Metals;
- Water; Emissions;
- Biomass; etc.
- Minerals;

Responsibilities/functions of the technical team

- ✓ **Selection of the data** to be analyzed;
- ✓ **Identification of data sources**;
- ✓ **Support and guidance on the data analysis**;
- ✓ **Guidance and validation on the data estimates** delivered by Circle Economy (when lack of data).

*Annex 1: Extended data analysis

The present analysis provides insights into where the circular economy would have the most impact within the three previously identified sectors: Advanced manufacturing, Commerce, and Tourism. Each sector is divided into subsectors, for which a **material flow** analysis is carried out. For each sector, the **waste treatment** methods are specified. Additionally, the most important **products** of each resource flow hint at what the flows actually consist of.

Material flows

The material flow analyses detail resource flows in terms of energy, water, biomass, minerals & chemicals, metals, and emissions. These resource flows include raw materials as well as (finished) products. They depict yearly material use and waste production and were calculated based on the most recent available data. In the case of lack of data, best estimates were employed, the sources of which are included in the reference page.



Energy

The energy flows include both fuels for direct use and fuels for electricity generation.



Biomass

The biomass flows include vegetable and animal products originating from agriculture and forestry, as well as prepared meals and food products.



Water

The water flows include both water withdrawn directly from the environment and tap water. In some cases, such as in the Metallurgy and metal products subsector, a share of the water is not consumed up. Rather, it is used for cooling and can thus be re-entered in the production process.



Minerals & Chemicals

The minerals & chemicals flows on the one hand include solid materials that are present in nature and products thereof, such as clay and bricks. On the other hand, they include chemical compositions and oil-based products such as plastics and rubber.



Metals

The metals flows include raw and processed metals and products thereof, varying from iron ores to paper clips.



Emissions

The emissions flows include only greenhouse gas emissions, the overwhelming majority of which consists of CO₂.

Waste treatment

Waste treatment is detailed per sector, and expressed according to five scenarios: reuse, recycling, energy recovery, landfill, and incineration - where reuse and landfill are respectively the most and least desirable options. Waste treatment numbers, too, are given in amounts per year, based on the most recent available data.



Reuse

Products are reused, maintaining their original shape and characteristics. Often, this requires the repair or replacement of parts of the product. As such, repairing, remanufacturing, and refurbishing activities are included. Reuse is the most desirable treatment method, for it guarantees the highest level of value retention.



Recycling

Products are processed in order for its source materials to be reused. Throughout the recycling process, value is lost, rendering recycling a suboptimal choice of waste treatment method.



Energy recovery

Resources are burned in order to generate heat or other energy. Whereas a small fraction of the product's value is captured, most value is lost.



Incineration

Resources are incinerated and converted into emissions. No heat or energy is captured and resources thus lose all value.



Landfill

Resources are diverted to a landfill site, or discharged in surface water. Not only is all value lost, landfilling waste causes high levels of environmental pressure.

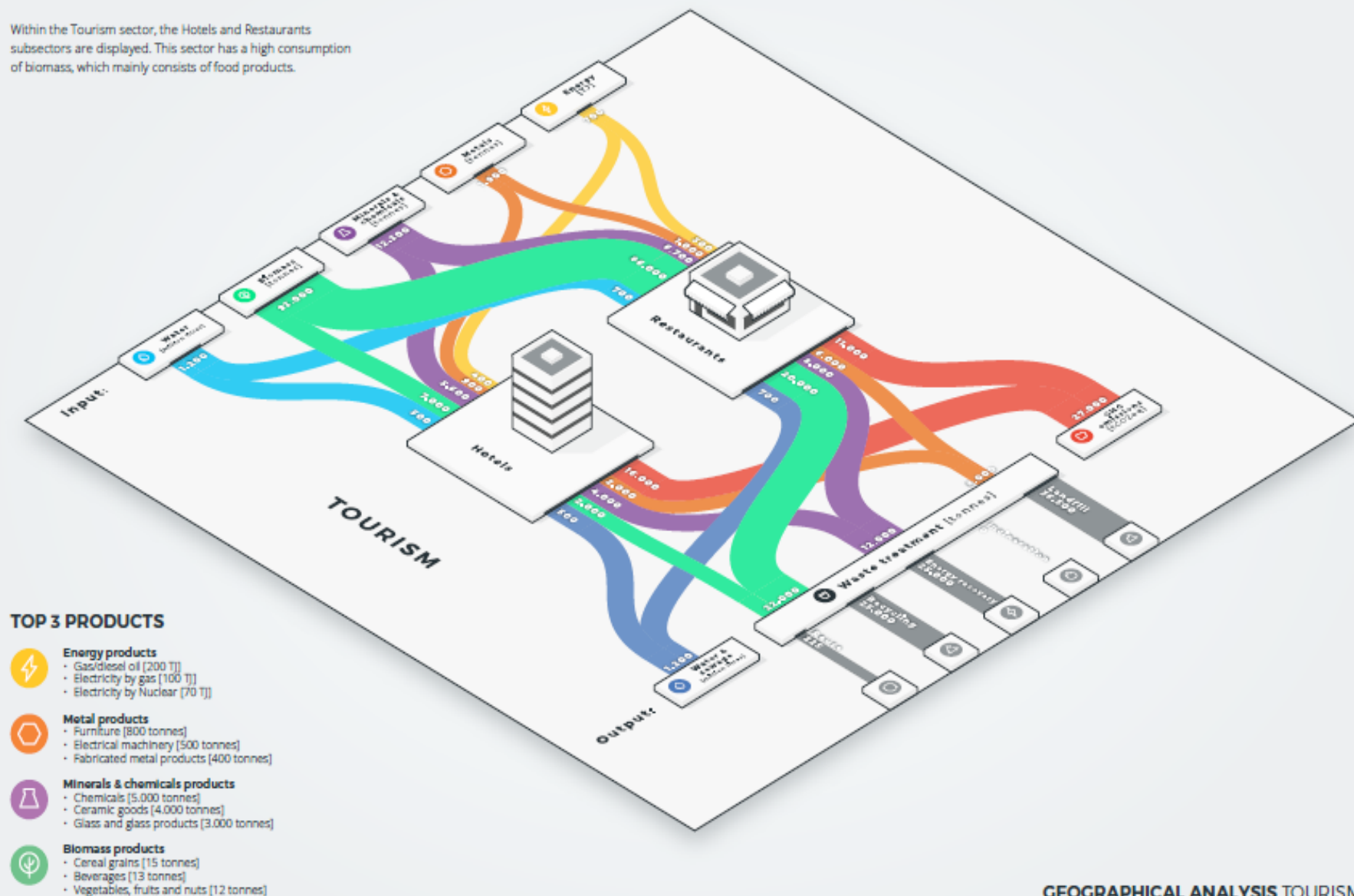
Products

In order to understand what the material flows are composed of and make them more tangible, the three most important products are identified for each flow in the three sectors. These products are selected based on mass used, and thus constitute a major share of the respective flow.

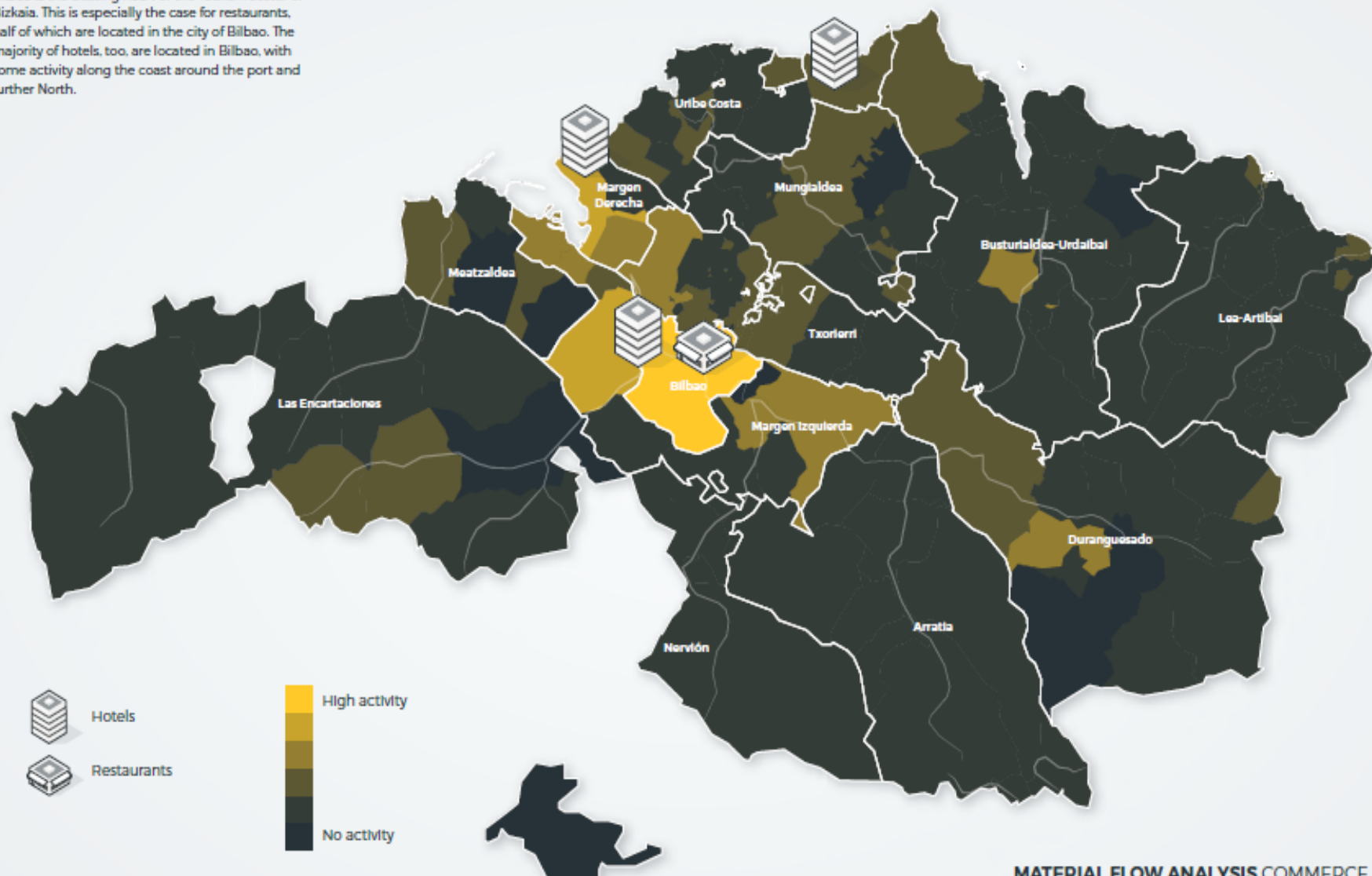


Figure 6: material flow analysis example

Within the Tourism sector, the Hotels and Restaurants subsectors are displayed. This sector has a high consumption of biomass, which mainly consists of food products.

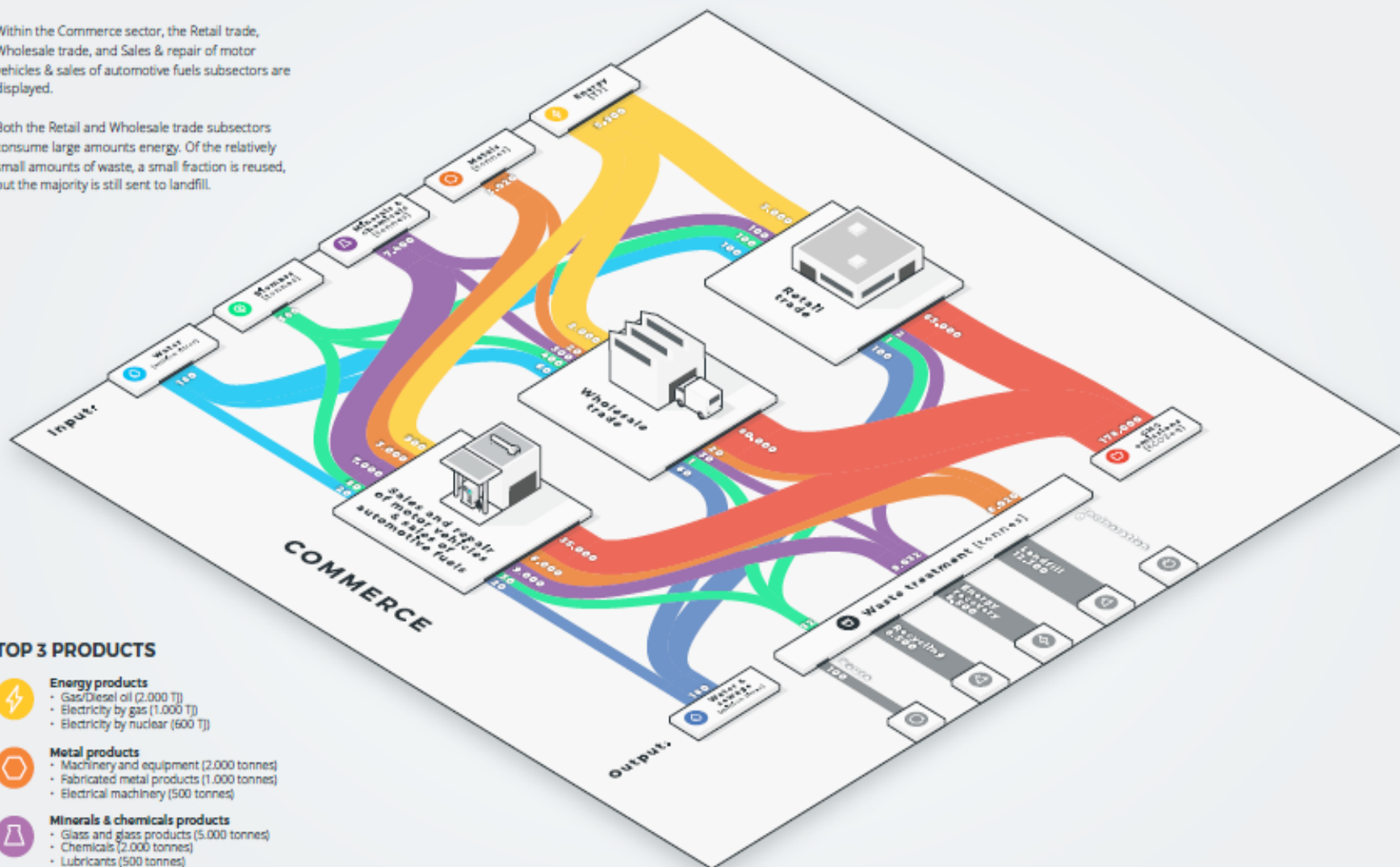


Bilbao is the beating heart of the Tourism sector of Bizkaia. This is especially the case for restaurants, half of which are located in the city of Bilbao. The majority of hotels, too, are located in Bilbao, with some activity along the coast around the port and further North.

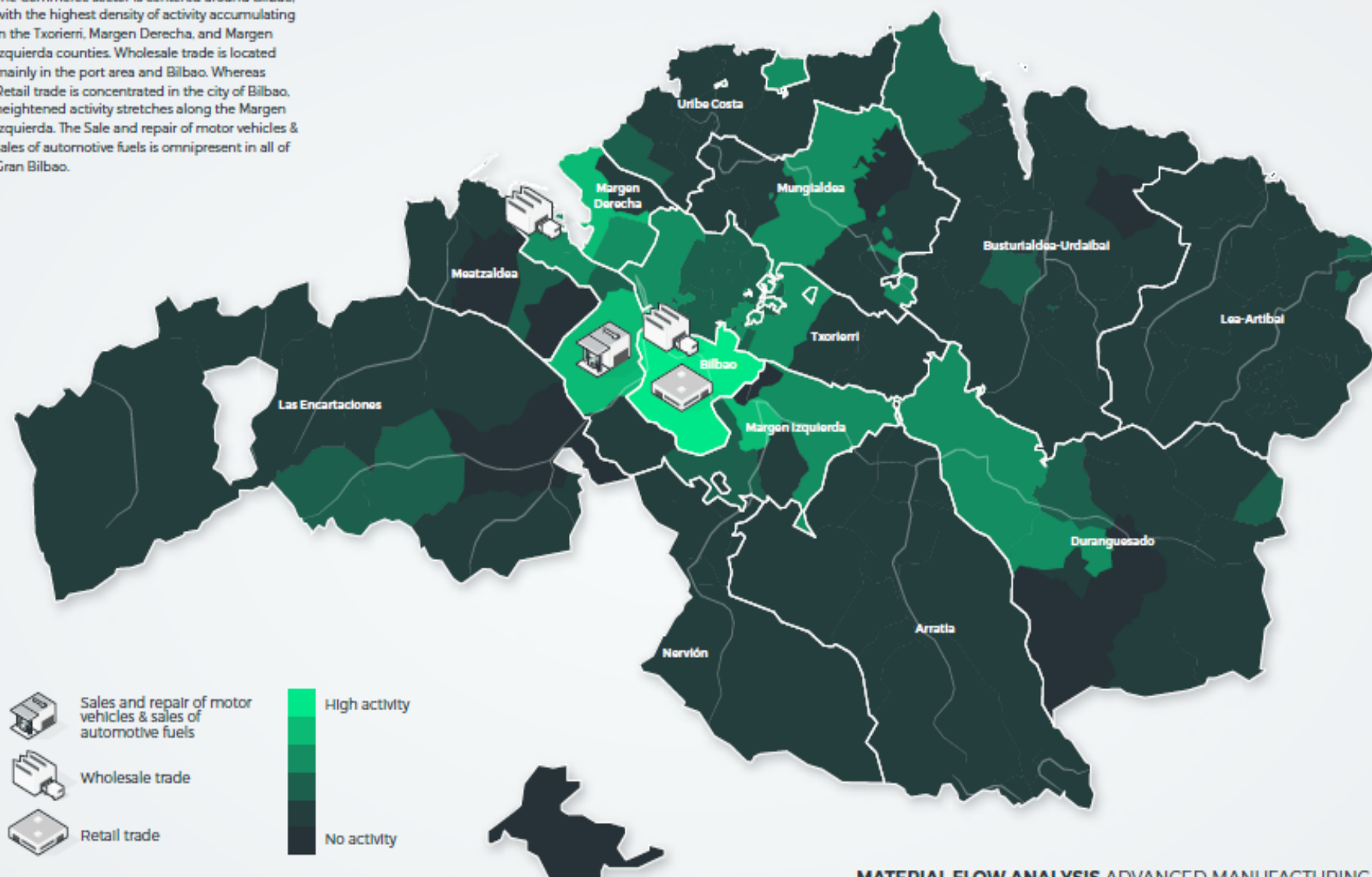


Within the Commerce sector, the Retail trade, Wholesale trade, and Sales & repair of motor vehicles & sales of automotive fuels subsectors are displayed.

Both the Retail and Wholesale trade subsectors consume large amounts of energy. Of the relatively small amounts of waste, a small fraction is reused, but the majority is still sent to landfill.

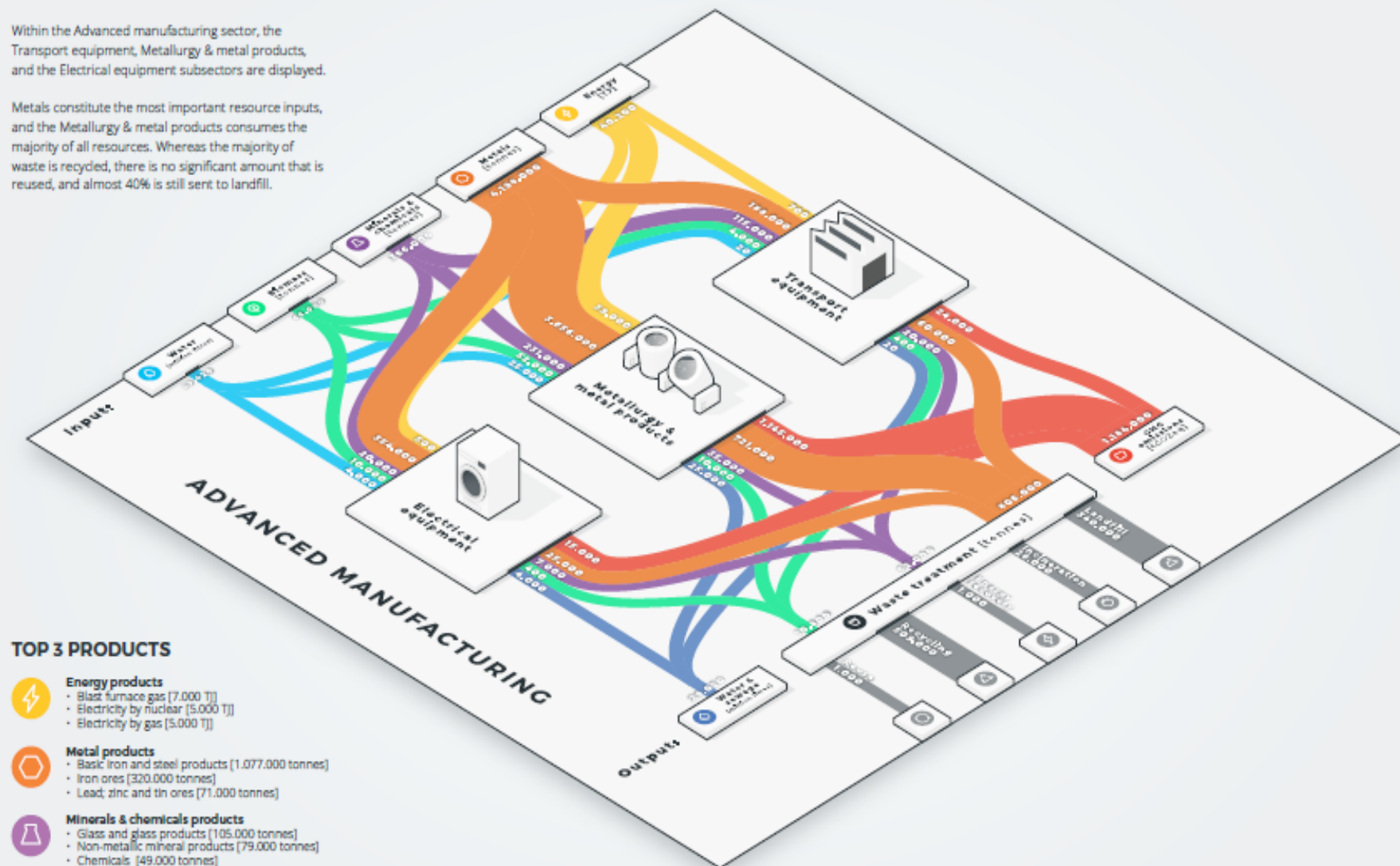


The Commerce sector is centered around Bilbao, with the highest density of activity accumulating in the Txoriemri, Margen Derecha, and Margen Izquierda counties. Wholesale trade is located mainly in the port area and Bilbao. Whereas Retail trade is concentrated in the city of Bilbao, heightened activity stretches along the Margen Izquierda. The Sale and repair of motor vehicles & sales of automotive fuels is omnipresent in all of Gran Bilbao.



Within the Advanced manufacturing sector, the Transport equipment, Metallurgy & metal products, and the Electrical equipment subsectors are displayed.

Metals constitute the most important resource inputs, and the Metallurgy & metal products consumes the majority of all resources. Whereas the majority of waste is recycled, there is no significant amount that is reused, and almost 40% is still sent to landfill.



TOP 3 PRODUCTS



Energy products

- Blast furnace gas (7.000 Tj)
- Electricity by nuclear (5.000 Tj)
- Electricity by gas (5.000 Tj)



Metal products

- Basic iron and steel products (1.077.000 tonnes)
- Iron ores (320.000 tonnes)
- Lead, zinc and tin ores (71.000 tonnes)



Minerals & chemicals products

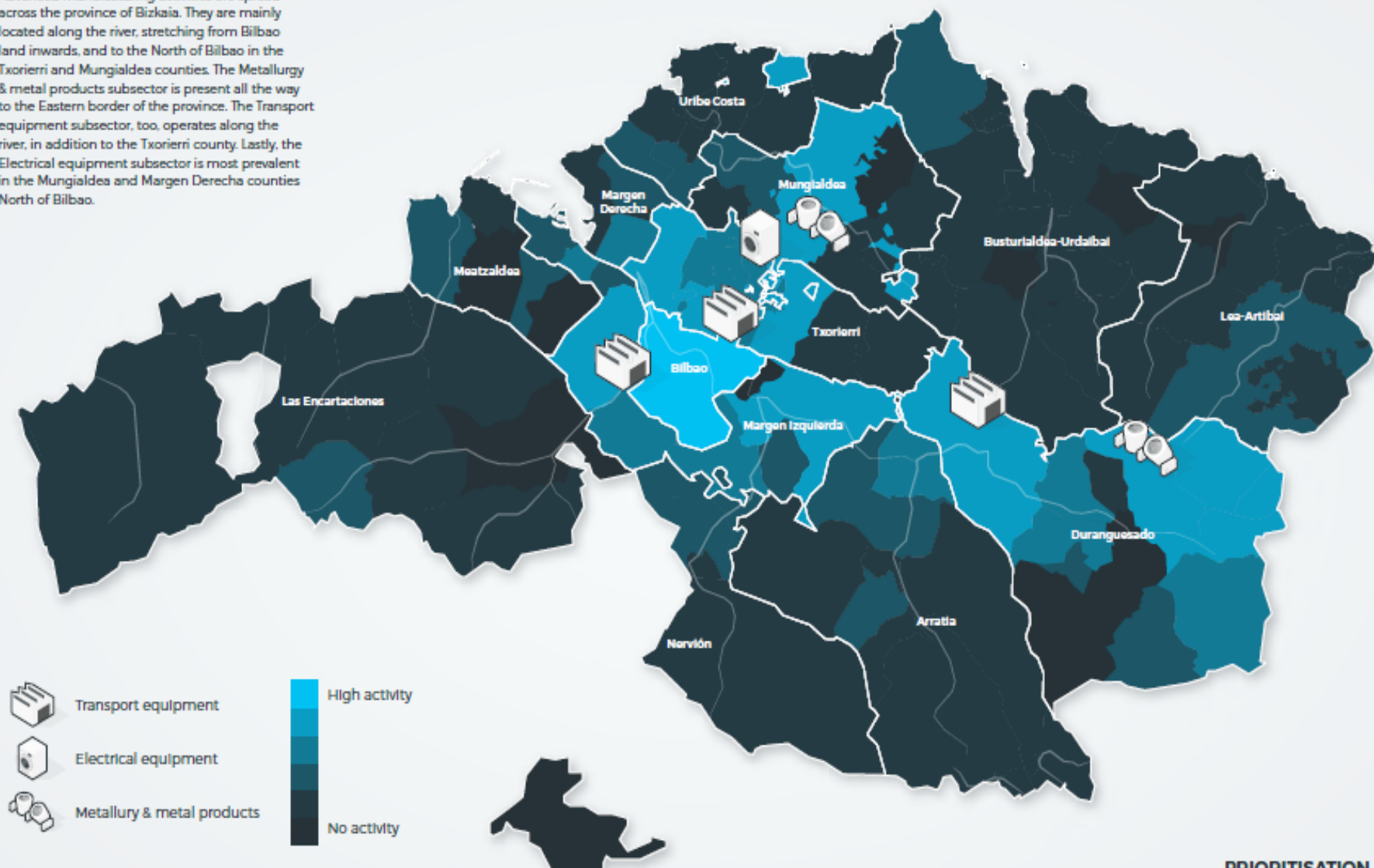
- Glass and glass products (105.000 tonnes)
- Non-metallic mineral products (79.000 tonnes)
- Chemicals (49.000 tonnes)



Biomass products

- Wood and products of wood and cork (34.000 tonnes)
- Forestry products (20.000 tonnes)
- Paper and paper products (4.000 tonnes)

Advanced manufacturing activities are spread across the province of Bizkaia. They are mainly located along the river, stretching from Bilbao land inwards, and to the North of Bilbao in the Txorierri and Mungialdea counties. The Metallurgy & metal products subsector is present all the way to the Eastern border of the province. The Transport equipment subsector, too, operates along the river, in addition to the Txorierri county. Lastly, the Electrical equipment subsector is most prevalent in the Mungialdea and Margen Derecha counties North of Bilbao.



The prioritisation chart provides insights regarding the circularity potential and economic relevance of the discussed subsectors. The final aim of the bubble chart is to provide support for the decision-making process regarding which subsector the analysis will be focusing on in the next phases.

The Metallurgy & metal products subsector and the Restaurants subsector have the highest potential, respectively due to mainly circularity potential and economic relevance. In a second belt, Retail trade, Wholesale trade, and Transport equipment can be found. The outer bound, representing the lowest rating subsectors, includes Sale and repair of motor vehicles & sales of automotive fuels, Electrical equipment, and Hotels.

The chart on the right displays a ranking of the eight subsectors based on circularity potential (x-axis) and economic relevance (y-axis). These scores are based on the following indicators:

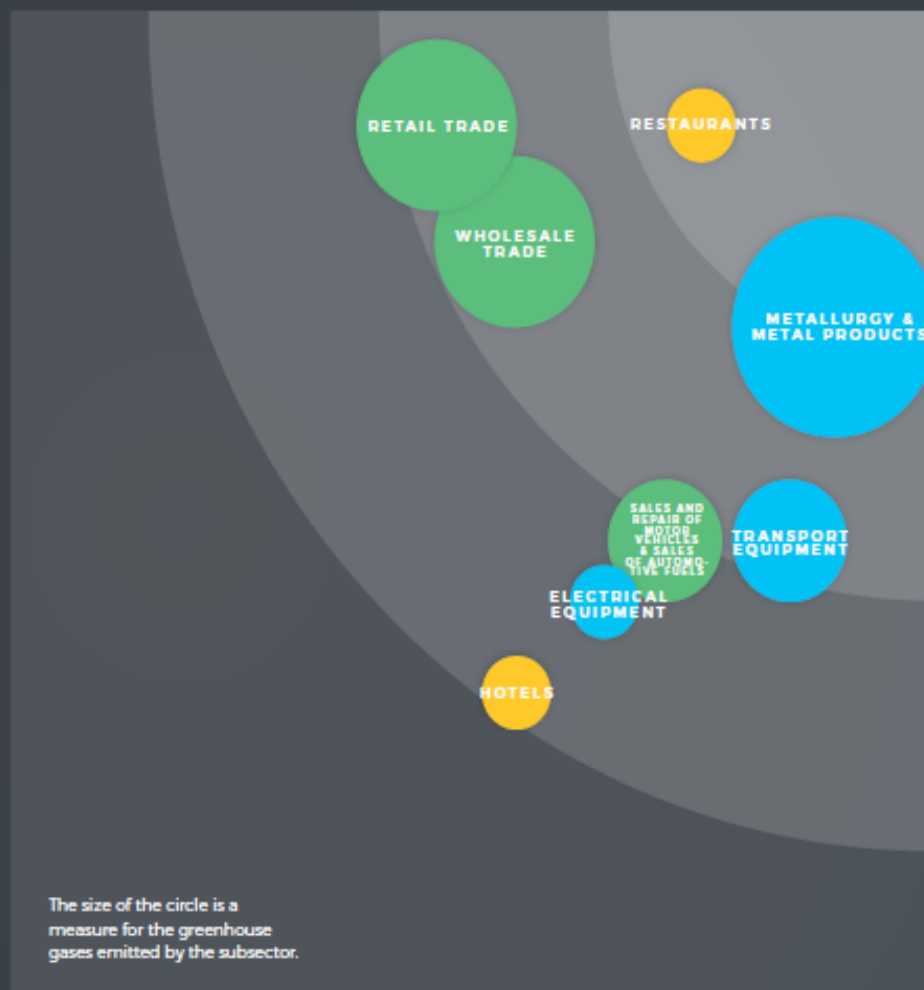
○ Circularity potential:

- Waste generation (tonnes): total amount of solid waste generated by the subsector over the year
- Material intensity (kg/€): amount of resources needed for the production of a monetary unit of that product
- Waste value recovery (%): share of solid waste which undergoes value recovery treatments

€ Economic relevance:

- Jobs: total number of employees per sub-sector
- Establishments: total number of establishments per sub-sector
- Gross value added: economic value generated by the sub-sector
- Strategic dimension: political relevance of the sub-sector for Bizkaia

€ ECONOMIC RELEVANCE >

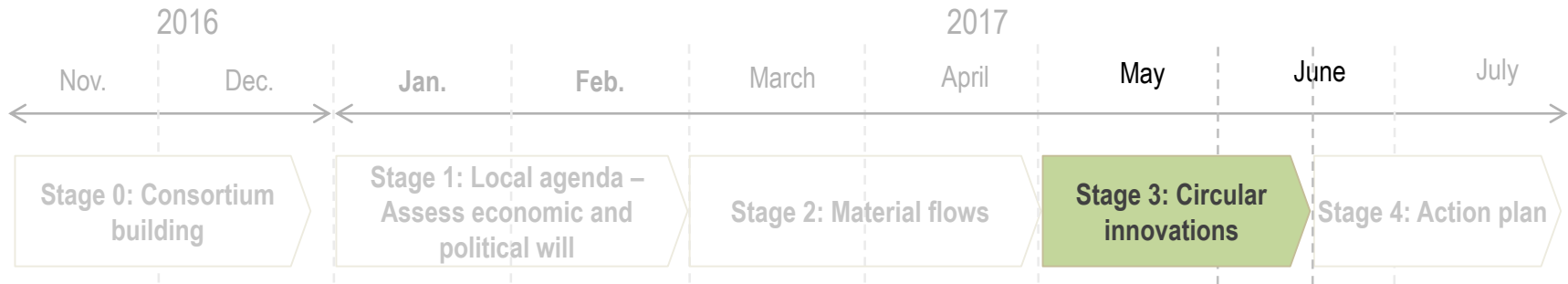


○ CIRCULARITY POTENTIAL >

Stage 3: Circular innovations



To outline the selected circular tangible strategies



- Each sector will show a different amount on resource consumption and other environmental impacts, and according to this, we will continue with a deeper analysis in all of them, or discharge some.
- According to the following funnel, **the steps to follow** will be:



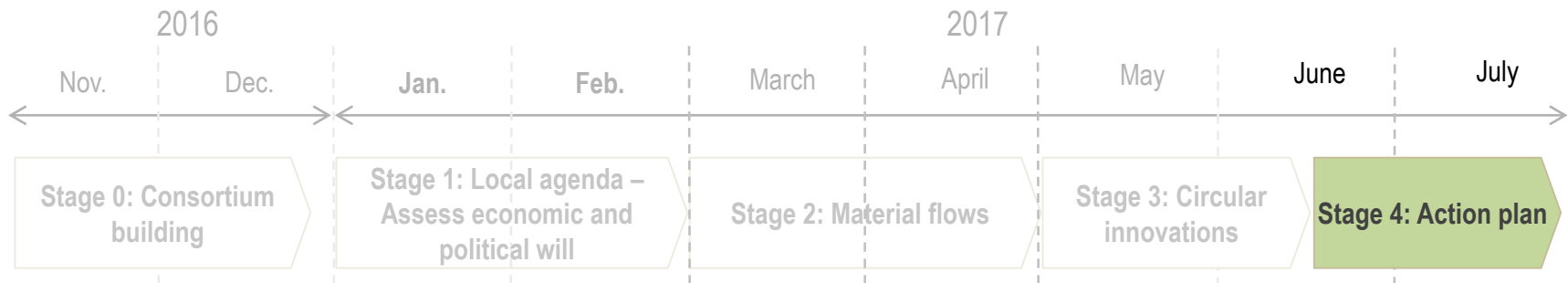
Responsibilities/functions of the technical team

- ✓ Participate in the **project prioritization** together with Circular Economy;
- ✓ Validate and support the established **selection criteria** of each stage;
- ✓ **Involve local organizations** in the prioritization; it is suggested to **create specific teams** for the analysis of sub-sectors and circular economy strategies.

Stage 4: Action plan



Demonstrating what first pilot companies can implement circular strategies, the (financial) benefits and requirements



- Each action plan will set **achievable goals for the first year** of implementation;
 - Initially, **small in scale** to make it practical and able to implement in a short period of time;
 - After this, there is **potential to scale up** the pilot projects enabling a cascade in other sectors;
 - It is mandatory to establish a **minimum number of companies** taking part in the projects, to make them valuable.
- **Companies have to play a necessary part** in bringing the selected strategies to reality.
- To cope with this objective, **organizations will need to be identified and convinced** of the benefits of participating in initial pilot projects

Responsibilities/functions of the technical team

- ✓ Support and guidance on the **action plan definition**;
- ✓ Selection of organizations that will be in charge of **pushing the implementation** of the projects
- ✓ Identification of **companies which will participate** in the project's implementation;
- ✓ Searching for **funding**;